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LABOR MIGRATION FROM AGRICULTURE IN THAILAND

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I. Introduction

1.1 Problems

One of the most prevalent phenomena in economic changes is a decline in the proportion of the agricultural labor force and agriculture's share of the Gross Domestic Product as an economy develops. This phenomenon has been widely recognized by economists and politicians, and empirical studies based on long-term changes and cross-section data of developed and developing countries support the observation.[1]

The phenomenon implies that income and the demand for labor in the agricultural sector grow relatively slowly compared to the non-agricultural sector. In a free market, the situation will allow labor to adjust itself, through migration to economic opportunities as cited by Kuznets. By such adjustment, the resource allocation and income disparity between the agricultural and non-agricultural sectors might not become serious

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1 Chenery, H.B., "Growth and Structural Change", Finance Development (IMF/IBRD), Vol. 8, September 1971, No. 3, pp/ 16-27. Kuznets and Thomas, Population Redistribution and Economic Growth in the United States, 1870-1950, Philadelphia, American Philosophical Society, 1957. Simantov, A., "The Dynamics of Growth and Agriculture", Zeitschrift fur Nationalokonomic, Vol. 27, No. 3, 1967, pp. 328-351. Dovring, F., Income Growth Rate and Sectors Proportions: The Share of Agriculture at Successive Levels of Incomes, AERR 97 Dept. of Agricultural Economics, University of Illinois, Urbana, 1968.

problems. However, if there are bottlenecks to the transfer of labor between agricultural and non-agricultural sectors, a large proportion of the labor remains in agriculture and may decline more slowly than would be expected under conditions in which factors were freely mobile. At the same time, agriculture's share of the total GDP may decline at a faster rate so that per capita income of the farm people may increase very slowly or may even decline. The situation may widen the income disparity between farm and non-farm people and become a serious problem unless farm income is proportionally raised or farm labor can transfer with ease. On the other hand, if the rate of labor transfer from agriculture exceeds the rate at which the non-agricultural sectors are able to absorb labor, or if qualifications of migrant workers do not meet requirements of the demand for labor, the transfer of labor may create several problems such as urban unemployment, low income of unskilled urban workers and other social problems. One of the crucial questions which economists can address relates to the size of the farm labor force that could be transferred in order to raise the per capita income to a certain level that also minimizes the economic and social problems in the non-agricultural sectors.

This important question leads us to investigate the case of Thailand in which agriculture is important in terms of employment and its contribution to GDP.

The number of people employed in agriculture and the values of agricultural output have been increasing in absolute terms. But agriculture's share in GDP and the proportion of the labor force employed in agriculture as well as the proportion of agricultural households have been declining as indicated in Table 1.

Table 1: Agriculture's Share in GDP, Employment and Total Households in Selected Years

	Agriculture's Shares		Per cent of Agricultural Households[2]
	in GDP[1](%)	in Employment[2](%)	
1960	38.2	82.4	73.9
1970	30.2	79.3	62.6
1975	30.4	73.0	n.a.
1976	29.2	75.8	n.a.

n.a. not available

Sources: 1 NESDB, the National Income Accounts, various versions

2 NSO, the Population Censuses and the Reports on Labor Force Survey, various versions

The former implies that the value added from agriculture has increased relatively slowly compared to those from non-agriculture. The latter implies the slowness of labor absorption in agriculture and/or the labor mobility from agriculture. Since the proportion of agriculture's

share in the GDP declined at a faster rate than those of the latter, this resulted in a widening income disparity ratio between farm and non-farm people: from 1 : 7.0 in 1960 to 1 : 9.5 in 1970. Even though the adjustments of the agricultural and non-agricultural incomes have been made, the data from the National Income Accounts still reflects the income differential.[2] According to Todaro's model,[3] such income differentials should mean that it is very attractive for farmers to move out of agriculture, unless there are barriers to labor mobility between agriculture and non-agriculture.

1.2 Objectives

The main purpose of this study is to investigate the labor mobility between agricultural and non-agricultural sectors and the mechanism of labor adjustment. The specific objectives of the study are as follows:

- To determine the factors influencing the migration decision of farmers or of their children.

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2 Pradit Charsombut, "The Redistribution of the Labor Force between the Agricultural and Non-Agricultural Sectors in Thailand". Unpublished Ph.D. Thesis (University of Illinois), Urbana-Champaign, 1978.

3 Todaro, M.P., "A Model of Labor Migration and Urban Unemployment in Less Developed Countries", American Economic Review, No. 1, March 1969, pp. 138-147.

- To find the barriers to labor mobility.
- To illustrate the differences of demographic characteristics and economic conditions of farmers and of workers who migrated from farms.
- To find the policy recommendations for labor mobility which will reduce the population pressure in the agricultural sector and to alleviate the income differentials and the economic and social problems in the non-agricultural sector.

1.3 Methodology

1.3.1 Definition. Labor migration from agriculture means the labor mobility from agriculture, which can be observed from changes in agricultural labor to non-agricultural labor, and changes in the agricultural household to the non-agricultural household.

1.3.2 Analyses. Both descriptive and econometric analyses are employed in the study. The study will illustrate the employment pattern in rural areas with emphasis on agricultural employment, and then the changes in the proportion of agricultural households and the affecting factors will be determined. The labor mobility from farm households and the allocation of labor for farm and non-farm activities of farm households will be investigated subsequently.

1.3.3 Sources of data. The primary data from 705 households are used for the study. The survey was made during April to June in 1979. The secondary data from the Office of National Statistics (NSO) and the National

Economic and Social Development Board (NESDB) are also used for the study.

Among the 705 households surveyed, the distribution is as follows:

Location		Number of Households
Pranakorn Sri Ayuthaya,	Central Plain	219
Samutsongkram,	Central Plain	180
Nakornrajsima,	Northeast	221
Khon Kaen,	Northeast	85
	Total	705

These four provinces were selected purposively. The reason for the selection of these four provinces for this study is the sharp decline in the proportion of agricultural households. Ayuthaya, the province closest to Bangkok, has more than 90 per cent of its cultivated area as farm land for paddy production. The proportion of agricultural households was 51.0 per cent in 1960, which declined to 42.4 per cent in 1970 (see Table 2). Samutsongkram province has about 90 per cent of its cultivated land in use for coconut growing. In this province, the proportion of agricultural households was 54.8 per cent in 1960, which declined to 31.0 per cent in 1970. In Nakornrajsima and Khon Kaen, farm land is relatively poor. Paddy and upland crops are the major crops in these areas. The proportion of

Table 2: Number of Total Households, and Agricultural Households in the Provinces Studied, in 1960 and 1970

Province	1960			1970			Rates of Decline in the Proportion of the Agricultural Households
	Total Households	Agricultural Households	Per cent of Agricultural Households	Total Households	Agricultural Households	Per cent of Agricultural Households	
Ayuthaya	90,273	46,022	51.0	92,577	39,295	42.4	16.86
Samuthasongkram	28,361	15,535	54.8	28,008	8,670	31.0	43.43
Nakornrajsima	186,395	155,065	83.2	249,651	178,275	71.4	14.18
Khon Kaen	140,175	117,343	83.7	169,884	127,940	75.3	10.12

Source: The Office of National Statistics, The Population Census 1960 and 1970, Bangkok.

agricultural households in Nakornrajsima and Khon Kaen were 83.2 and 83.7 per cent in 1960, declining to 71.4 and 75.3 per cent in 1970, respectively. In the first two provinces in the Central Plain, agricultural households declined in both absolute and relative terms. In the last two provinces, agricultural households declined in relative terms but increased in absolute terms. The decline in agricultural households and their proportion implies the transfer of agricultural households to non-agricultural households, or the slow increase in the number of agricultural households compared to that of non-agricultural households.

II. Employment Patterns in Rural Areas

2.1 The Total Labor Force

According to the population census, the total labor force in Thailand was 13.84 million in 1960, increasing to 16.85 million in 1970. In 1975, the Labor Force Survey of the Office of National Statistics reported 18.18 million as the total labor force. The majority of the labor force and employed persons live in rural areas. In 1970, about 90% of the total labor force and employed persons lived in rural areas. In 1975, the proportion of the rural labor force and of the employed persons was about 88 per cent, gradually declining as

the economy progressed. However, the rural labor force and employed persons are still a major component of the total labor force in Thailand (see Table 3).

Table 3: The Number of the Total Labor Force, the Number and Proportions of the Rural Labor Force and Employed Persons in 1970-1977

Year	Number (1,000)			Rural as the Per cent of the Whole Kingdom	
	Total Labor Force of the Whole Kingdom	Rural Labor Force	Rural Employed Persons	Labor Force	Employed Persons
1970[1]	16,850	15,141	14,987	89.85	90.15
1971[2]	16,619	14,859	14,840	89.22	89.30
1972	16,129	14,245	14,199	87.85	88.03
1973	17,043	15,060	15,017	87.99	88.11
1974	17,159	15,153	15,112	87.94	88.07
1975	18,182	16,168	16,125	88.57	88.69
1976	18,411	16,377	16,267	88.21	88.35

Sources: 1 NSO, 1970 Population and Housing Census.

2 NSO, Report of the Labor Force Surveys, Round 2 (July-September 1971-1976).

Regionally, about 3.4 per cent of the total population and the labor force are in the Northeast, where people are relatively poor. The rest, 32, 22 and 12 per cent of the total population and the labor force are distributed among the Central Plain, the North and the South, respectively. The distribution

of the population and the labor force does not change much over a decade.

2.2 Employment by Industry

Among employed persons in rural areas, 88 per cent were in agriculture in 1971. The proportion of those employed in agriculture declined sharply in 1974 when there was a boom in the service, manufacturing, commerce, and transportation sectors. Large proportions of rural workers were attracted to non-farm activities. However, this outflow slowed down and was reversed in 1975 and 1976 with depressing developments in the oil crisis, the labor disputes in urban markets and the withdrawal of American troops. At the same time, the international market was particularly favorable for agricultural products. As a result, a large portion of unemployed workers in non-farm sectors were pulled back to agricultural production, resulting in an increasing proportion of the total labor force employed in agriculture in 1975 and 1976.

Except in 1974, the non-agricultural industries in rural areas employed less than 20 per cent of the total rural employment. These non-agricultural industries including commerce, service and manufacturing were only able to employ less than 10 per cent of the total rural employment, through the period 1971-1976.

Based on the definition used in the Labor Force

Table 4: Per cent of Rural Employment Persons Classified by Industries, 1971-1976

Industries	Round 2 (July-September)					
	1971	1972	1973	1974	1975	1976
All industries	100%	100%	100%	100%	100%	100%
Agriculture	87.86	81.37	81.07	73.70	81.77	85.18
Mining	0.11	0.79	0.70	0.31	0.17	0.15
Manufacturing	2.38	5.75	4.99	8.34	5.84	4.32
Construction	0.72	1.26	1.19	1.32	0.82	0.95
Public	0.02	0.03	0.15	0.23	0.09	0.10
Commerce	4.02	4.73	5.19	6.61	4.38	3.88
Transportation	0.59	1.28	1.60	2.10	1.35	1.02
Services	4.29	4.78	5.10	7.38	5.58	4.39
Other	0.06	0.01	0.01	0.01	-	0.01
Subtotal of non-agriculture	12.12	18.65	18.93	26.30	18.22	14.82

Source: NSO, The Labor Force Survey, Round 2, various issues, 1971-1976.

Survey of the NSO, open unemployment because of supply exceeding the demand for labor is not a serious problem in Thailand. For the kingdom as a whole, open unemployment is about one per cent over a long period. In urban areas, the open unemployment rate is above one per cent, but in rural areas it is less than one per cent, even in the dry season. This is due to a high

degree of self-employment, resulting in labor force participation having a positive relationship with wage rates. The self-employed activities can easily utilize labor from family members during the slack season. In fact, it is estimated that about 95 per cent of rural employment in agriculture is self-employment. Only about 5 per cent of employed persons work as employees. Among all economic activities in rural areas, about 85 per cent of the total employment is self-employment.

2.3 Changes in the Occupation of Agricultural Households

Although the majority of the population and the labor force are in agriculture, labor migration from agriculture is an apparent phenomenon in the process of economic development. In the period from 1960 to 1970, the number of agricultural households in many provinces, particularly in the Central Plain, have declined, indicating the transfer of agricultural households and agricultural labor to non-agriculture.

Over the same period, the proportion of agricultural households declined in all provinces. For the whole kingdom, the proportion of agricultural households declined from 73.9 per cent in 1960 to 62.6 per cent in 1970. Similarly, the proportion of agricultural households declined in all regions of Thailand. Rapid decline in the proportion of agricultural households

took place in the Central Plain and in the South. In the North and the Northeast, the proportion declined slowly from 77.4 to 69.6 per cent and from 87.0 to 78.3 per cent, respectively. The decline in the proportion of agricultural households was due to the transfer of agricultural households to non-agriculture, and/or the slow increase in the number of agricultural households, compared to that of agricultural households. The first case indicates the labor mobility from agriculture, while the latter implies the relatively weak ability for labor absorption in agriculture. The decline in the proportion of the agricultural households implies at least a trend of labor mobility from agriculture.

2.4 Factors Affecting the Decline in Agricultural Households

In this section, an attempt will be made to explain the decline in the proportion of agricultural households. It is hypothesized that landless and farm tenancy usually depressed farmers sufficiently to move out of agriculture. In this study, rented areas of farms in each province were used as a proxy variable for push factors. On the other hand, per capita income of the population in each province is used as a proxy variable for the level of development which can absorb labor from agriculture. Based on the provincial data (except Bangkok-Thonburi) from the 1960 and 1970 population

Table 5: Number of Total Households, and Agricultural Households by Regions in 1960 and 1970

Regions	1960			1970			Rates of Decline in the Proportion of the Agricultural Households
	Total Households	Agricultural Households	Per cent of Agricultural Households	Total Households	Agricultural Households	Per cent of Agricultural Households	
Whole kingdom	4,616,654	3,410,309	73.9	5,939,869	3,718,361	62.6	15.29
North	1,077,719	833,856	77.4	1,370,072	954,220	69.6	10.08
Central Plain	1,427,262	789,632	55.3	1,829,965	735,383	40.2	27.31
South	616,655	486,361	78.9	774,346	488,779	63.1	20.03
Northeast	1,495,018	1,300,460	87.0	1,965,513	1,539,979	78.3	10.00

Source: The Office of National Statistics, The Population Census 1960 and 1970, Bangkok.

censuses, rented areas of farms from the 1963 agricultural census and per capita income by provinces, the results of statistical analysis are shown in equation 1:

$$H = 8.214 + 0.182A + 0.12Y \quad \ldots\ldots\ldots\ldots \quad (1)$$
$$(1.94) \quad (4.65)$$
$$R^2 = .3384$$
$$n = 69$$

where:

H = percentage decline in agricultural households by province;

A = per cent of rented areas for farms by province; and

Y = per capita income (at constant prices) in unit of 100 bahts.

The coefficient of determination, R^2 = 33.84 per cent, indicates the relationship of the decline in the proportion of agricultural households and the explanatory variables which are the rented areas and per capita income.

The per capita income which is the proxy variable for the level of development has a positive relationship with the percentage decline in agricultural households. As the level of development increases, non-farm job opportunities increase resulting in a percentage decline in agricultural households. The t-value statistics indicate the levels of statistical significance at the 99 per cent levels. As per capita income increases

by 100 bahts, the percentage decline in agricultural households increases by 0.12 per cent.

The positive relationship between the rented areas for agriculture and the decline in relative terms of agricultural households comes out as expected. The statistical result can be interpreted as the increasing degree of tenancy having allowed or having forced farmers to leave agriculture. In the first case, the farmers who do not want to work on farms because of small pieces of land or because of the relatively low income from farms, may rent out their own land and switch to non-agricultural jobs. This situation may not hurt society if the price of labor used among occupations is fair. People have their chance to select an occupation as they are concerned about relative income among occupations.

In the latter case, the high degree of tenancy with high rent may create poverty and force the farmers to leave agriculture. In this case, farmers are pushed out of their farms by land tenure problems. If the situation of land tenancy forces farmers to leave agriculture, it will not benefit either agriculture or society itself. Farmers are forced to leave their farms because of poverty caused by unfair factor prices.

In summary, although the majority of the labor force and employed persons in Thailand are engaged in agriculture, the proportion of the agricultural labor force and of agricultural households have declined, indicating labor

mobility from agriculture. At least two factors -- rented areas as a push factor and a level of development as a pull factor can explain the labor mobility from agriculture.

III. Labor Mobility from Agricultural Households

3.1 Distribution of the Households Surveyed

To achieve the objective of the study, a survey of 705 rural households was undertaken from April through June 1979. Random samplings were made and information about characteristics of the labor force, allocation of labor among farm and non-farm enterprises, and their income from labor were collected by interviewing headmen of households. The households surveyed are distributed by areas studied and types of households as shown in Table 6.

It was found that among 705 households surveyed, 134 households or 21.11 per cent are non-agricultural households. The non-agricultural household means the household in which the headman is engaged in a non-farm enterprise as a major occupation, while a farm household means the household in which the headman is engaged in farm enterprises. The survey found that the proportion of non-farm households in rural areas varies among provinces. In Ayuthaya, the province closest to the

Table 6: The Distribution of Total Households Surveyed by Type and by Areas Studied

Area Studied (Province)	Types of Households		
	Agricultural Households	Non-Agricultural Households	Per cent of Non-Agricultural Households
Ayuthaya	166	53	24.20
Samutsongkram	140	40	22.22
Nakornrajsima	191	30	13.57
Khon Kaen	74	11	12.94
Total	571	134	21.11

Bangkok Metropolis, the survey found the highest proportion of non-agricultural households. In Khon Kaen and Nakornrajasima, the most developed provinces in the Northeast, only about 13 per cent of the non-agricultural households were found. The small proportion of non-agricultural households found in Khon Kaen and Nakornrajasima are consistent with the low rates of decline in the proportion of the agricultural households as shown in Table 6.

3.2 Characteristics of the Households Surveyed

3.2.1 Family Size

On the average, the size of the family is quite large. For non-agricultural households, the average is 7.66 persons per family. The average size of the agricultural family was not much different in the provinces surveyed. However, only 86.29 per cent of the family members remained in the agricultural household during the week of the survey. For non-agricultural households, the family size was 6.75 persons per family. The average family size varied in the provinces studied. In Khon Kaen, the family size of a non-agricultural household was only 5.45 persons compared to 7.17 persons in Ayuthaya. This is because the non-agricultural households in Khon Kaen are young families (see Table 7).

3.2.2 Characteristics of the Household Members

On the average, half of the total family members are male. The sex proportion is not much different among areas studied and types of households. The non-agricultural household is a young family compared to a farm family. For all areas studied, the average age of the members in a non-farm family is 25.65 years old, compared to 28.13 years for the members of a farm family. The proportion of children, aged less than 11 years is higher for the non-family than for that of the farm family. The

Table 7: Characteristics of the Households Surveyed

Characteristics		Ayuthaya	Samut-songkram	Nakorn-rajsima	Khon Kaen	Total
Agricultural Households						
Family members -	Total	7.27	7.95	7.72	7.82	7.66
	Male	3.60	3.96	3.82	4.01	3.83
	Female	3.67	3.99	3.90	3.81	3.83
Average age (years)		29.26	28.06	27.77	26.69	28.13
Age > 11 years (persons)		5.87	6.78	6.33	6.66	6.35
Married (persons)		3.61	3.59	3.52	3.82	3.60
Average year of education (years)		4.61	5.0	4.37	4.67	4.64
Residence in a household (persons)		5.61	6.24	6.43	6.54	6.14
Non-Agricultural Households						
Family members -	Total	7.17	6.98	6.26	5.45	6.75
	Male	3.43	3.10	2.92	3.18	3.21
	Female	3.74	3.88	3.34	2.27	3.54
Average age (years)		25.24	29.48	22.49	22.82	25.65
Age > 11 years (persons)		5.23	6.08	4.77	4.09	5.27
Married (persons)		3.0	3.6	2.74	2.27	3.05
Average year of education (years)		4.97	5.16	4.80	6.39	5.09
Residence in household (persons)		6.32	5.35	5.26	4.91	5.66

information implies that most of the non-farm families are young families. On the average, the level of education of members in a non-farm family is higher, 5.09 years, compared to 4.64 years for the members of a farm family. Also, the size of the farm household is larger than that of the non-farm household. There are 6.35 persons in the working age group per family compared to 5.27 persons in a non-farm household.

3.3 History of the Non-Agricultural Households

Among 134 non-farm households, about 72 per cent transferred from farm families. The information indicates that labor migration out of agriculture has existed in the areas studied. In the Northeast, almost all non-farm households came from farm families; but in Ayuthaya, only two-thirds of them came from farm families. Among 96 farm households in which labor moved out, only 77 per cent of them owned farm land. Before the headmen of the non-agricultural households moved out of their farms, their parents had owned relatively large amount of farm land, on an average of 37.0 rai.[4] However, the average size of the farm land of the ancestors of both farm and non-farm families was not much different. Only the proportion of their children who were engaged in non-farm enterprises and the average years of education

4 rai = 0.395 acre = 0.16 hectare

show the differences. On the average, a non-farm household came from a family with 4.89 children and their average education was 4.27 years. Among these 4.89 persons, 41.72 per cent engaged in non-farm enterprises when they grew up.

On the other hand, a headman of a farm household came from a larger family of 5.06 children. Their children's average level of education was 3.58 years. Among 5.06 children, only 16 per cent were engaged in non-farm enterprises when they grew up. This information implies that the occupation of family members and the level of education may have influenced the decision making to select occupations for their family members.

Table 8: History of Agricultural and Non-Agricultural Households Classified by Characteristics of Households

Characteristics of Households	Non-Agricultural Households	Agricultural Households
Total households	134	571
From agricultural household	96	536
With parents owned farm land	74	415
Parents' average farm size (rai)	37.0	35.0
Children of their family (persons)	4.84	5.06
Children's education (year)	4.27	3.58
Engaged in agriculture	2.49	4.03
Engaged in non-agriculture	2.04	0.82

3.4 Characteristics of the Non-Farm Labor Force

Among 705 households, the survey finds that there were 512 persons working in non-farm enterprises during the surveyed year. This number includes the people who worked either full-time or part-time in non-farm jobs. On the average, 0.47 persons of an agricultural household and 1.82 persons of a non-agricultural household worked in non-farm enterprises. These people worked more than 200 days per year and their average earnings from non-farm jobs were more than twelve thousand bahts a year. This information implies that non-farm jobs provide substantial employment and income for non-farm workers. Also, the average wage paid per day from non-farm jobs is about 10 bahts above that for farm jobs.

The data shows interesting information about the characteristics of the non-farm labour force. On the average, the non-farm labor force has a higher level of education than that of rural people. In a farm household, the family member has an average of 4.64 years of education; but for those who are engaged in non-farm enterprises, they have an average education of 6.09 years. Besides that, they have some experience in non-farm jobs and from migration (see Table 9). This information implies that one who works in a non-farm enterprise has a higher level of human investment than for one who works on a farm.

Table 9: Characteristics of the Non-Farm Labor Force

Characteristics	Agricultural Households	Non-Agricultural Households
No. of observations	571	134
No. of persons in non-farms	268	244
Total days worked	269	234
Average annual earnings, baht/person	12,947	13,866
Experience on farms (months)	43.42	82.00
Used to work in non-farms (months)	1.53	8.4
Months of migration	9.32	9.29
Years of education before starting non-farm jobs	5.93	4.82
Level of current education (years)	6.09	5.09

It is surprising that the average level of education of the non-farm labor force in a farm household is higher than that of the non-farm labor force in a non-farm household. This information may imply that regardless of their levels of education, the members of non-farm households have to work on non-farm enterprises, while the members of farm households have a choice of working in either farm and non-farm enterprises, but one who has a higher level of education tends to work on a non-farm enterprise. However, the non-farm labor force from the farm household has less experience in non-farm work than that of the labor force from a non-farm household.

In summary, the survey indicated that more than two-thirds of non-farm households came from agricultural households. It is inconclusive to say that the size of the farm land of their ancestors forces their children to move out of the farms. However, a level of education and occupation of their brothers and sisters seems to reflect the transfer of labor from agriculture.

IV. Labor Allocation between Farm and Non-Farm Enterprises

The data from previous sections reveals that transfers of agricultural labor begin by working temporarily in non-farm enterprises for some members of farm households. After having some experience in non-farm jobs, some of them are engaged in non-farm jobs permanently. In this section, the study will investigate the labor allocation of a farm household for farm and non-farm enterprises to determine factors affecting the decision-making of labor allocation for non-farm enterprises.

4.1 Assumptions

4.1.1 A farm household is an economic unit which aims to maximize income from labor used in production. A headman of a household is responsible for the decision making to allocate labor for farm and non-farm enterprises.

4.1.2 The labor force of a family includes all family members regardless of sex or age, and all their working time is countable.

4.1.3 Labor supply is measured in days worked, meaning an acceptable working day for farmers which might be 6, 8 or even 10 hours per day. This assumption is noted because measuring working time is not commonly practised among Thai farmers.

4.2 Hypothesis

4.2.1 There is a positive relationship between total family income and family labor used for farm and non-farm enterprises; but the income elasticity of family labor used for non-farm activities is greater than that for farm enterprises. The acceptance of the hypothesis implies that an increase in labor used will increase the total family income. However, a unit of labor allocation for a non-farm enterprise will generate a higher average income than that from a farm enterprise.

4.2.2 It is hypothesized that non-farm wage rates, land holding or tenancy, level of education, experiences in non-farm enterprises of family members, and the proportion of the young family labor (age 11-30 years) to the total labor force of a family, will reflect labor allocation for farm and non-farm enterprises.

4.3 Characteristics of the Households and the Labor Force

Among 705 households, the survey found that there were 360 households whose family members were engaged in both agricultural and non-agricultural enterprises, including enterprises within and outside the household. The 360 households are distributed among the areas studied as follows:

Ayuthaya	137	Households
Samutsongkram	72	Households
Nakornrajsima	111	Households
Khon Kaen	46	Households
Total	360	Households

Among these households, there were 6.45 persons per household; 5.12 persons were of working age (11 years and above); and 1.33 persons were children aged less than 11 years. However, only 3.83 persons per household or 59.38 per cent of the total members of household were in the labor force. In the Northeast, the average number of family members and the persons in the labor force of a household were greater than those of the households in the Central Plain as shown in Table 10.

4.4 Labor Utilization

Although the family members of the 360 households

Table 10: The Average Number of Family Members, the Labor Force, and the Non-Labor Force per Household by Areas Studied, 1978-1979

Unit: Person

Areas Studied	Total Family	Persons in Working Age (11-60 years)			Persons Age Less than 11 Years	Persons Age Above 60 Years	Persons Not In the Labor Force
		Total	Labor Force	Do Not Work			
Central Plain	6.15	4.43	3.66	0.77	1.27	0.45	2.49
Ayuthaya	5.95	4.04	3.46	0.58	1.37	0.54	2.49
Samutsongkram	6.50	5.14	4.00	1.14	1.07	0.29	2.50
Northeast	6.83	5.10	4.06	1.04	1.39	0.34	2.77
Nakornrajsima	6.81	4.03	4.04	0.99	1.20	0.58	2.77
Khon Kaen	6.89	5.28	4.11	1.17	1.33	0.28	2.78
Total	6.45	4.72	3.83	0.89	1.32	0.41	2.62

were engaged in both farm and non-farm enterprises, the majority of them worked in agriculture. Among 3.83 employed persons in a household, 1.19 persons worked in both farm and non-farm enterprises; 0.73 persons worked in non-farm enterprises only; and 1.91 persons worked in farm enterprises only, during the surveyed year. Regionally, the average employed persons per household in the Central Plain were 3.66 persons. Among these, 1.66 persons, 0.75 person, and 1.24 persons in a household worked on farms only, non-farms only, and both farms and non-farm enterprises, respectively. In the Northeast, during the surveyed year the average number of employed was 4.06 persons. Among these numbers, 2.22 persons, 0.70 person and 1.13 persons worked on farms only, non-farm only, and both farms and non-farm enterprises, respectively. In the Northeast, the average number of employed persons was 4.06 persons during the surveyed years. Among these persons, 2.22, 0.70 and 1.13 persons worked on farms only, non-farm only, and both farm and non-farm enterprises, respectively.

Based on the assumption that a worker cannot work more than 360 days a year, the survey found that in the Central Plain, the average days worked per household were 793.02 days, of which 455.35 and 337.67 were days worked in farm and non-farm enterprises, respectively. In the Northeast, the average days worked per household were 943.27, of which 608.78 and 334.49 were days worked

in farm and non-farm enterprises, respectively (see Table 11).

On the average, the employed person in the Northeast had worked 232.33 days per year, which can be compared to the 216.67 days for the employed in the Central Plain. However, the average days worked in non-farm enterprises for employed persons in the Central Plain were greater than that of employed persons in the Northeast. On the other hand, the average days worked in farm enterprises for employed persons in the Central Plain were less than that of the employed in the Northeast.

4.5 Gross Income of a Household

Gross income of a household comes from both agriculture and non-agriculture. Income from agriculture consists of the value of crops and livestock and income from agriculture outside a household. The annual agricultural income per household was 18,064.73 bahts and 17,296.07 bahts in the Central Plain and in the Northeast, respectively. Income from crops is a major source of the agricultural income. In the Central Plain, crops value accounted for 76.11 per cent of the total agricultural income, while it was 59.44 per cent in the Northeast. In the latter, income from livestock was also an important component of agricultural income, accounting for 36 per cent of the agricultural income. But income from working in agriculture outside the

Table 11: Number of Employed Persons and Days Worked per Household in 1978-1979

Region	Farm Only		Non-Farm Only		Both Farm & Non-Farm		
	Employed Persons	Days Worked	Employed Persons	Days Worked	Employed Persons	Days Worked on Farm	Days Worked Non-Farm
Central Plain	1.66	285.93	6.75	193.97	1.24	169.42	143.70
Ayuthaya	1.36	196.10	0.59	163.44	1.52	198.60	178.67
Samutsongkram	2.21	449.69	1.06	249.51	0.74	111.32	80.07
Northeast	2.22	450.33	0.70	193.28	1.13	158.45	141.21
Nakornrajsima	2.13	340.70	0.65	207.61	0.97	153.22	144.68
Khon Kaen	2.47	576.74	0.54	158.70	1.11	171.09	132.83
Both Regions	1.91	357.63	0.73	193.67	1.19	164.64	142.61

household is the relatively small amount of 790.16 bahts per household in the Northeast, compared to 1,719.51 bahts per household in the Central Plain.

Non-agricultural income accounted for almost half of the total household income. However, the proportions of non-agricultural income vary among regions. In the Central Plain, the non-agricultural income of an average household was greater than the agricultural income. But in the Northeast, income from non-agriculture is about 94.53 per cent of the agricultural income. Since most factories and non-farm enterprises are located in Bangkok and in the provinces around Bangkok, people in the Central Plain have better opportunities to work in non-agricultural enterprises. In Ayuthaya, the province closest to Bangkok, non-agricultural income accounted for 55.20 per cent of the total income of a household. But in Khon Kaen, the province in the Northeast, the non-agricultural income accounted for only 42.76 per cent of the total income of a household.

Non-agricultural income comes from working in factories, commerce, and government jobs. The income from subsidy is the money received from sons and daughters who have left the family, and accounted for only 6.83 per cent of the non-agricultural income (see Table 12).

The data of cash income from the Office of Agricultural Economics indicated that in 1975-76 the non-agricultural

Table 12: Gross Income per Household from Agriculture and Non-Agriculture in 1978-1979

Unit: Baht

Region	From Agriculture			From Non-Agriculture		
	Value of Crops and Livestocks	Agriculture Outside Household	Total Income from Farm	Income from Non-Farm Work	Income from Subsidy	Total Income from Non-Agriculture
Central Plain	16,345.22	1,719.51	18,064.73	16,821.39	1,336.48	18,157.87
Ayuthaya	14,346.63	1,138.28	15,484.91	17,683.02	1,398.28	19,081.30
Samutsongkram	19,981.54	2,777.01	22,758.55	15,253.69	1,224.02	16,477.71
Northeast	16,505.91	790.16	17,296.07	15,357.15	992.17	16,349.32
Nakornrajsima	15,643.47	678.15	16,321.62	15,677.89	1,363.69	17,041.58
Khon Kaen	18,587.00	1,060.43	19,647.43	14,583.17	95.65	14,678.82
Both Regions	16,415.30	1,314.21	17,729.51	16,182.82	1,186.32	17,369.14

20.5 bahts = 1 US$

income per household was 8,227.39 bahts in the Central Plain and 4,005.50 bahts in the Northeast.[5] The data from the survey indicated a much higher increase in income in 1978-79. The great difference may be due to the size of the sampling. The observations in this study were made in areas with high rates of decreases in the number of agricultural households whose income may be affected by the concentration of non-farm enterprises. The data from the Office of Agricultural Economics covered larger areas, including remote areas and poor provinces. The average non-agricultural income of the households from such areas should be lower.

The data from the Office of National Statistics indicated the average income of rural households in the Northeast was only 64.72 per cent of that of the rural household in the Central Plain.[6] But the data from the survey indicated that the income of the average household in the Central Plain and in the Northeast is not much different. The data imply that among the households with members who work in both agriculture and non-agriculture, income was not much different.

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5 Office of Agricultural Economics, Agricultural Statistics of Thailand, crop year 1976-77, Bangkok.

6 NSO, Report on Socio-Economic Survey, 1975-76, Bangkok.

4.6 Changes in the Total Family Income due to Labor Allocation

To test the first hypothesis, the Ordinary Least Square Method is employed. The statistical analysis indicates the labor allocation of farm households among farm and non-farm enterprises can reflect the total family income. The coefficients in equation 2-7 have statistical significance at the 99 per cent level. The coefficients in equation 2, 4 and 6 indicate that a percentage change in labor allocation for non-farm enterprises will have more effect on the percentage change in the total family income. In the Central Plain, the coefficient of labor used for non-farm enterprise is 0.3637 compared to 0.2240 of the labor used for farm enterprises. In the Northeast, similar results also appear. The statistical results indicate the acceptance of the first hypothesis, in which an increase in labor uses for farm and non-farm enterprises will increase the total family income. However, one per cent of labor uses for non-farm enterprises will generate higher income than the labor uses for farm enterprises. The acceptance of the hypothesis indicates that to increase the total family income, family labor must be allocated more for non-farm enterprises. And if an increase in income is an objective of a household, it is expected that family labor will be allocated or transferred more to non-agriculture.

1. Central Plain

$$\log Y = 3.0192 + 0.2240 \log La + 0.3637 \log Ln \quad ....(2)$$
$$(4.4977) \qquad (8.2096)$$

$$R^2 = 0.2837, \; n = 203$$

$$Y = 13250.9317 + 17.6533 La + 1.9790 Ln \quad ....(3)$$
$$(3.6341) \qquad (6.5156)$$

$$R^2 = 0.1988, \; n = 203$$

2. Northeast

$$\log Y = 2.8458 + 0.2316 \log La + 0.396 \log Ln \quad ....(4)$$
$$(3.1350) \qquad (5.9432)$$

$$R^2 = 0.2272, \; n = 157$$

$$Y = 11353.8132 + 10.2460 La + 45.5919 Ln \quad ....(5)$$
$$(2.5902) \qquad (7.6746)$$

$$R^2 = 0.2941, \; n = 157$$

3. Central Plain & Northeast

$$\log Y = 3.0148 + 0.2055 \log La + 0.3720 \log Ln \quad ....(6)$$
$$(4.9750) \qquad (9.8589)$$

$$R^2 = 0.2440, \; n = 360$$

$$Y = 13207.8672 + 12.7481 La + 43.0224 Ln \quad ....(7)$$
$$(4.0776) \qquad (9.5964)$$

$$R^2 = 0.2211, \; n = 360$$

where:

Y = Total family income in the surveyed year, unit in baht.

La = Family labor used for farm enterprises in the surveyed year, unit in days worked

Ln = Family labor used for non-farm enterprises in the surveyed year, unit in days worked

t - values in parentheses

4.7 Factors Affecting Labor Allocation to Non-Farm Enterprises

To determine the factors affecting labor allocation to non-farm enterprises, the Ordinary Least Square Method is also employed. Both linear and double log-linear forms are employed to estimate the statistical values. The most appropriate equations are selected and the results are presented in Equation 8-13.

Central Plain

$$\log Ln = 2.191 + \underset{(3.359)}{0.142 \log Wn} - \underset{(-0.209)}{0.012 \log LAN} - \underset{(-0.647)}{0.042 DL} + \underset{(1.848)}{0.033 Kn} \quad ....(8)$$

$R^2 = 0.070$, n = 203

$$Ln = 133.079 + 1.069\ Wn + \underset{(2.214)}{0.720\ EXP} + \underset{(3.33)}{7.927\ ED} + \underset{(2.282)}{164.143\ AGE} - \underset{(-0.675)}{0.460\ LAN} + \underset{(1.719)}{0.004\ Kn} \quad ....(9)$$

$R^2 = 0.121$, n = 203

Northeast

$$\log Ln = 2.291 + \underset{(3.511)}{0.164 \log Wn} - \underset{(-1.486)}{0.078 LAN} + \underset{(0.931)}{0.075 DL} - \underset{(-1.110)}{0.022 \log Kn} \quad ....(10)$$

$R^2 = 0.118$, n = 157

$$\log Ln = 1.898 + 0.145 \log Wn + 0.018 \log EXP$$
$$(3.156) \qquad (0.550)$$
$$+ 0.667 \log ED - 0.010 \log AGE$$
$$(3.264) \qquad (-0.049)$$
$$- 0.098 \log LAN - 0.031 \log Kn \qquad ....(11)$$
$$(-1.855) \qquad (-1.569)$$
$$R^2 = 0.173, \; n = 157$$

Both Regions

$$\log Ln = 2.232 + 0.155 \log Wn - 0.044 \log LAN$$
$$(4.971) \qquad (-1.187)$$
$$-0.010 \; DL + 0.011 \log Kn \qquad ....(12)$$
$$(-0.224) \quad (0.857)$$
$$R^2 = 0.072, \; n = 360$$

$$Ln = 119.485 + 1.308 \; Wn + 0.700 \; EXP$$
$$(3.420) \quad (3.906)$$
$$+ 13.213 \; ED + 155.387 \; AGE - 0.645 \; LAN$$
$$(1.773) \quad (2.790) \quad (-1.613)$$
$$+ 0.002 \; Kn$$
$$(0.978) \qquad ....(13)$$
$$R^2 = 0.116, \; n = 360$$

where:

Wn = An average non-agricultural wage rate of members of a household, measured in bahts per day.

LAN = Areas of land used for farming of a household, measured in unit of rai.

DL = A dummy variable for land tenure,
1 = for a household with land renting and
0 = for a household with land owning only.
ED = Average level of education of family members, age 11-60 years, measured in years.
EXP = Average years of experience of family members in non-farm jobs before being engaged in non-farm enterprises, measured in units of month.
AGE = Proportion of the young labor force, age 11-30 years to the total labor force.
Kn = Capital stock in non-farm enterprises, measured in values of baht.
t - values in parenthesis.

The results of the study indicate that the hypothesized variables: non-agricultural wages, areas of land used for farming, land tenancy, level of education, experiences in non-farm jobs, proportion of the young labor force, and the capital stock in non-farm enterprises, can explain the supply of family labor for non-farm enterprises less than 25 per cent. The coefficients of non-agricultural wages, experiences in non-farm enterprises and the proportion of the young labor force, have statistical significance at the 95 per cent level. Other variables are inconclusive.

4.7.1. Non-Agricultural Wages. On the agerage of

360 households, the non-agricultural wage is 47.98 bahts per day, compared to 27.53 bahts per day. The data indicate a wide gap of agricultural wage rates. In the Northeast, the average non-agricultural wage rate is double that in agriculture. However, the average non-agricultural wage rate in the Northeast is about 88 per cent of that in the Central Plain (see Table 13).

In both regions, a number of days worked on non-agriculture by family members increases as the average wage rate increases. The statistical results from equations 8, 10 and 12 indicate that the coefficients of non-agricultural wages have statistical significance at the 99 per cent level. The coefficient of wage rate in the Northeast (equation 10) is 0.164 compared to 0.142 in the Central Plain (equation 8). The results imply that the supply elasticity of family labor for non-farm enterprises is inelastic. However, in the Northeast where the relative wage of non-farm to farm is high, the elasticity of the supply of labor is higher than that in the Central Plain.

4.7.2 Area of Land Holding for Farming. Usually, an area of land holding for farming or an area of land used for agriculture is associated with labor utilization for agriculture. A larger area of land used for agriculture may deduct family labor used for non-farm enterprises. The survey found that on the average, an

Table 13: Non-Agricultural Wage Rates and Agricultural Wage Rates per Day Classified by the Number of Days Worked and by Regions

Days Worked in Non-Agricultural	Central Plain		Northeast		Both Regions	
	Agricultural Wage Rate	Non Agricultural Wage Rate	Agricultural Wage Rate	Non Agricultural Wage Rate	Agricultural Wage Rate	Non Agricultural Wage Rate
1 - 90	26.27	48.30	20.00	36.52	24.94	43.66
91 - 180	36.50	40.38	27.86	38.07	31.85	39.26
181 - 270	38.33	46.84	24.00	48.35	34.18	47.45
271 - 360	27.36	49.43	19.14	41.41	25.04	46.05
361 - 450	39.00	48.77	20.00	50.83	26.00	49.42
451 - 540	27.50	62.27	21.67	39.00	24.00	51.19
541 - 630	34.83	59.61	22.50	45.60	25.90	53.24
631+	29.50	47.60	23.33	54.53	27.44	51.57
Average	31.69	49.69	21.91	43.58	27.53	47.98

area of land holding for agriculture was 24.32 rais per household in the Central Plain. Of this figure, only 41.69 per cent was owned by household; 52.66 per cent was rented and the rest was an area used free of charge. In the Northeast, the average area of land holding was larger than in the Central Plain, 27.43 rais per household. Of this figure, 86.0 per cent was owned by a household; only 6.05 per cent of the total farm areas were rented.

The results of statistical analyses indicated a negative relationship between a size of land holding for agriculture and the number of days worked for non-farm enterprises. However, the coefficients of this variable in both regions were not statistically significant at the 95 per cent level.

A dummy variable for the land tenure system is also employed. The coefficient of a dummy variable is not statistically significant at the 95 per cent level.

4.7.3 Levels of Education. The survey found that the average level of education of farm people was not much different. In the Central Plain, the average level of education of household members who are 11 years of age and above was 4.9 years compared to 4.8 years in the Northeast. The statistical results indicated that only in the Northeast can the level of education reflect the farm labor supply for non-farm enterprises. The statistical

results implied that in the Northeast where non-farm enterprises were limited, a person with a higher level of education had a better opportunity to work on a non-farm enterprise.

4.7.4 Age. The survey found that in the Central Plain, about 3 persons or 62 per cent of the total household labor force, were the labor force, age 11-30 years. In the Northeast, the labor force was 3.3 persons or about 64 per cent of the total family members in the working wage. The statistical results indicated that as the proportion of the young labor force increases, the farm labor supply for non-farm enterprises increases. This indicated a trend of labor migration from agriculture prevailing among children of farm households. However, this variable fails to reflect the labor supply for non-farm enterprises in the Northeast, where the size of observations is relatively small.

4.7.5 Experience. Most of the workers who work in non-farm enterprises have the experience of about 11 months in farming and about 16 months in non-farm working. The statistical analyses indicated that experience in non-farm jobs can reflect the labor supply for non-farm enterprises. Better or longer experience in non-farm work before being engaged in the current non-farm job, will increase days worked in non-farm

enterprises. However, this variable is inconclusive in the Central Plain.

4.7.6 Investment in Non-Farm Enterprises. The survey found that the value of capital stock in non-farm enterprises of a farm household in the Central Plain was only 1,744 bahts compared to 8,705 bahts for the farm enterprise. In the Northeast, the value of capital stock for non-farm enterprises of the average household was only 903 bahts compared to 3,193 bahts for the farm enterprises. The data indicated a lower proportion of investment in non-farm enterprises of a farm household, because farming is a main occupation of rural households. The statistical analyses indicated that the coefficient of the values of capital stock for non-farm enterprises shows a positive relationship with the days worked for non-farm enterprises, but had no statistical significance at the 95 per cent level.

The results of analyses in this section indicate that only wage rates in non-farm enterprises, experience in non-agriculture and the proportion of the young labor force can reflect the labor supply for non-farm enterprises.

V. Conclusion

The majority of the population and the labor force of Thailand live in rural areas, and about 90 per cent of them are engaged in agriculture. The agricultural labor force still increases in absolute terms, but decreases slowly in relative terms. In some provinces, the proportions of the agricultural labor force have decreased sharply since the last decade. Cross-section data from the survey also indicate that two-thirds of the non-agricultural households in the survey came from agricultural families.

By using the aggregate data of each province, the study finds that land tenancy is a push factor depressing farm people to move out from farms; and a higher level of development in each province is a pull factor stimulating the transfer of labor from agriculture to non-agriculture.

It is expected that the labor transfer from agriculture to non-agriculture will continue in the process of economic and social development. By using cross-section data, it is found that household income increases faster if more labor is allocated for non-farm enterprises. Furthermore, the study indicates a narrow gap of income differentials among those households whose members work both in agriculture and non-agriculture. At least three factors can reflect the labor transfer from agriculture to non-agriculture. These factors

are non-agricultural wage rates, experience in non-agricultural work as well as higher education, and the proportion of the young labor force. The supply of labor for non-agriculture increases. The elasticity of the labor supply is inelastic. The second variable is the proportion of the young labor force. As the young labor force in a household increases, a trend of labor migration from the farm increases. This indicates that during this decade, and the next one, labor migration from farms will increase at high rates because a large number of young people will enter the labor force. Experience in non-farm work and higher education will improve their qualifications for non-farm jobs.

Based on the results of the study, it is recommended that the income of rural people be increased, and that job opportunities both on farms and off-farms should be promoted. However, non-agriculture can stimulate the income of rural people faster than agriculture. Several kinds of non-agricultural enterprises can be promoted in rural areas. Although the study does not investigate kinds of non-agricultural enterprises, it is plausible to say that cottage industry and small-scale industry which have existed in rural areas, should be promoted to absorb rural labor. Such non-farm jobs should be able to provide employment and income for rural farm households. Training skills and higher education should

be provided to rural people. Such provisions will improve the human investment of rural people, which will in turn also improve choices of work and reduce the income differential among the employed persons.

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SEAPRAP

THE SOUTHEAST ASIA POPULATION RESEARCH AWARDS PROGRAM

PROGRAM OBJECTIVES

* To strengthen the research capabilities of young Southeast Asian social scientists, and to provide them with technical support and guidance if required.

* To increase the quantity and quality of social science research on population problems in Southeast Asia.

* To facilitate the flow of information about population research developed in the program as well as its implications for policy and planning among researchers in the region, and between researchers, government planners and policy makers.

ILLUSTRATIVE RESEARCH AREAS

The range of the research areas include a wide variety of research problems relating to population, but excludes reproductive biology. The following are some examples of research areas that could fall within the general focus of the Program:

* Factors contributing to or related to fertility regulation and family planning programs; familial, psychological, social, political and economic effects of family planning and contraception.

* Antecedents, processes, and consequences (demographic, cultural, social, psychological, political, economic) of population structure, distribution, growth and change.

* Family structure, sexual behaviour and the relationship between child-bearing patterns and child development.

* Inter-relations between population variables and the process of social and economic development (housing, education, health, quality of the environment, etc).

* Population policy, including the interaction of population variables and economic policies, policy implications of population distribution and movement with reference to both urban and rural settings, and the interaction of population variables and law.

* Evaluation of on-going population education programs and/or development of knowledge-based population education program.

* Incentive schemes — infrastructures, opportunities; overall economic and social development programs.

SELECTION CRITERIA

Selection will be made by a Program Committee of distinguished Southeast Asian scholars in the social sciences and population. The following factors will be considered in evaluating research proposals:

1. relevance of the proposed research to current issues of population in the particular countries of Southeast Asia;
2. its potential contribution to policy formation, program implementation, and problem solving;
3. adequacy of research design, including problem definition, method of procedure, proposed mode of analysis, and knowledge of literature;
4. feasibility of the project, including time requirement; budget; and availability, accessibility, and reliability of data;
5. Applicant's potential for further development.

DURATION AND AMOUNT OF AWARDS

Research awards will be made for a period of up to one year. In exceptional cases, requests for limited extension may be considered. The amount of an award will depend on location, type and size of the project, but the maximum should not exceed US$7,500.

QUALIFICATIONS OF APPLICANTS

The Program is open to nationals of the following countries: Burma, Indonesia, Kampuchea, Laos, Malaysia, Philippines, Singapore, Thailand and Vietnam. Particular emphasis will be placed on attracting young social scientists in provincial areas.

Applications are invited from the following:

* Graduate students in thesis programs

* Faculty members

* Staff members in appropriate governmental and other organizations.

Full-time commitment is preferable but applicants must at least be able to devote a substantial part of their time to the research project. Advisers may be provided, depending on the needs of applicants.